



The Case for Teaching Face-to-Face (Tomahawk, Ice-Pick or Inverse) Intubation

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Objective:

To compare standard endotracheal intubation to the two-person face-to-face intubation technique in both the reclining and the sitting positions.

Methods:

Study Design

Randomized prospective trial.

Participants and Setting

34 paramedic students and 21 first and second year medical students at an academic medical center.

Interventions

- All subjects were given a short instructional video followed by small group practice sessions for the various techniques.
 - Paramedic students received eight to twelve practice sessions for standard technique and two practice sessions for both face-to-face sitting and reclining techniques.
 - Medical students were given one practice session for standard technique and one practice session for face-to-face sitting technique. They were not taught the face-to-face reclining technique.
- Subjects were trained and tested using a MacIntosh blade on a standard full-body, intubating mannequin placed on a height-adjustable paramedic stretcher.
- Subjects were then tested on the different techniques
 - Paramedic students were tested on all techniques approximately one week later.
 - Medical students were tested on the standard and face-to-face techniques later the same day.

Measurements

- Each subject performed the procedures in random order while being videorecorded.
- Raters reviewed the video data and measured the time from the moment the laryngoscope touched the mannequin until the final attempt to pass the endotracheal tube.
- Raters also noted the number of times the subjects clicked the teeth.
- Subjects were given surveys to record their preference for each procedure.

Outcomes Measured

- The percent failure to intubate for each procedure.
- The percent completed intubations at 15, 20 and 30 seconds.
- The number of times the teeth were clicked.
- The percentage of students who prefer each procedure.

Data Analysis

- Cochran Q test
- Chi Square

Laryngoscopist's Role in the Two-Person Sitting Technique

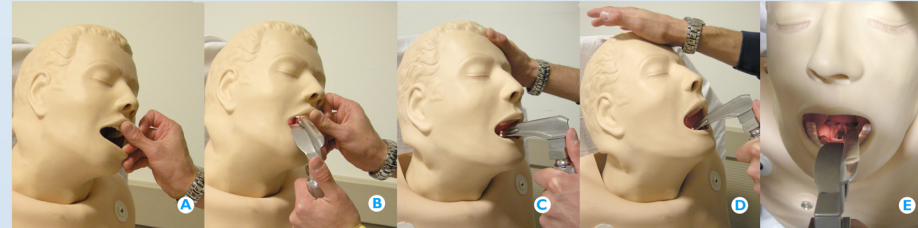


fig. A-B Demonstrates the proper technique for opening the mouth and inserting the blade. Of note, in the upright position, the tongue tends to fall into the inferior oral cavity, which may make the right-to-left sweep of the tongue - a step commonly missed by novices - less important.



fig. C-D With the tip of the blade either in the vallecula or directly displacing the epiglottis, the 'jaw thrust' maneuver is performed by pulling the blade anteriorly before extending the head. This will result in the patient being placed in the 'sniffing' position. Once in this position, the head is hyperextended by pushing backwards on the forehead.

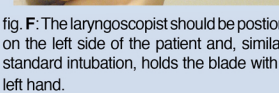


fig. F: The laryngoscopist should be positioned on the left side of the patient and, similar to standard intubation, holds the blade with the left hand.

fig. E: When in the seated position, both the laryngoscopist and the intubator can then visualize the cords.

The paramedic stretcher is ideal for sitting intubation since it is easy to adjust the height for the shorter laryngoscopist. It is also narrow so the laryngoscopist can be as centered as possible without straddling the patient.



The straddling position has been shown to offer the laryngoscopist significantly more reserve force, if needed, as compared to other positions*. This may be useful in the difficult airway patient when RSI cannot be utilized.

Note the positioning of the laryngoscopist on the left of the patient and the intubator on the right allows for both to easily view the glottis. Although most EMS articles** and text describe using the right hand in single-person, face-to-face intubations, this would be awkward in the two-person technique.

*Tesler, Janet et al. Rescuer Position for Tracheal Intubation on the Ground, *Resuscitation* 2003; 56: 83-9
 ** Andjelic, Sladjana. Face-to-Face Intubation in Traumatized Patients, *Anestezjologia i Ratownictwo* 2009; 3: 193-19



The two-person face-to-face reclining intubation is performed in the same manner as the sitting intubation except that the patient is now reclining on the stretcher.

Reviewing the tapes, it appears subjects found it difficult to maintain the bent-over position. Upon standing, the laryngoscope's position became displaced, resulting in the loss of glottis visualization by the intubator.

If the patient is on a wide ED stretcher or on an inpatient bed, then kneeling on the bed may facilitate a more centered position for the laryngoscopist.

Using a second person frees up a hand which can be used to increase the oral opening or to suction blood/secretions.



Results:

- Of the 55 subjects, 53 (33 paramedics and 20 medical students) completed the trials on video. (Two had incomplete videos).
- All of the sitting face-to-face intubations were successful, whereas five (9%) of standard intubations were missed, $P = .025$.
- Although all paramedic students were successful performing the reclining face-to-face intubation, they were significantly less successful in completing the procedure at 15 and 20 seconds compared to either of the other techniques, $P = .03$
- Only one medical student clicked the teeth using the standard intubation technique.

PERCENT SUCCESSFUL INTUBATIONS FOR PARAMEDIC STUDENTS AT VARIOUS TIMES

	Standard	Sitting Face-to-Face	Reclining Face-to-Face
15 seconds*	97	97	75
20 seconds**	97	100	84
30 seconds	100	100	94

* $P = .007$ ** $P = .03$

PERCENT SUCCESSFUL INTUBATIONS FOR MEDICAL STUDENTS AT VARIOUS TIMES

	Standard	Sitting Face-to-Face	Reclining Face-to-Face
15 seconds	25	56	not performed
20 seconds *	25	69	not performed
30 seconds	75	75	not performed

* $P = .016$

PERCENTAGE OF MISSED INTUBATIONS

	Standard	Sitting Face-to-Face	Reclining Face-to-Face
Paramedic students	3 [†]	0	0
Medical students*	20 ^{††}	0	not performed
Total**	9	0	not applicable

[†] One subject failed to intubate the trachea after 2 minutes.

^{††} Four subjects placed the tube in the esophagus

* $P = .046$ ** $P = .025$

PERCENT PREFERENCE FOR EACH TECHNIQUE

	Standard	Sitting Face-to-Face	Reclining Face-to-Face
Paramedic students*	35	54	12
Medical students*	10	90	not performed

* $P < .05$

Conclusion:

- Subjects were more successful and faster at performing the two-person sitting face-to-face endotracheal technique than either the standard or two-person reclining face-to-face technique.
- Subjects rated the two-person sitting face-to-face technique easiest to perform.

Limitations:

- Mannequin not human subjects.
- Novice vs. experienced intubators.
- Long term retention not evaluated.

Discussion:

Advantages of the Sitting Position

- Oral pharyngeal volume is greater, making successful intubations more likely.*
- Pre-oxygenation in the sitting position lengthens the time to desaturation, especially in obese patients.**
- Preferred position for many patients in respiratory distress, i.e., COPD, asthma, CHF, epiglottitis.
- Preferred position for patients with intraoral bleeding.
- Aspiration from passive regurgitation may be lessened.***

Advantages of Using two People

- Stress of difficult intubation shared.
- Free hand for suctioning.
- A preliminary trial suggested the face-to-face techniques were more successful when performed with two people.

Disadvantages of the Sitting Position

- Not practical during CPR or for possible spine injured patients.
- May be difficult for shorter laryngoscopists.
- May require more time to position patients before intubation.

Disadvantages of Using two People

- Requires coordination between people.
- Requires a second person to be available.

*Eckmann, David et al. Acoustic Reflectometry and Endotracheal Intubation. *Anesth Analg* 1996;83:1084-9
 **Allermatt, F.R. et al. Pre-oxygenation in the Obese Patient: Effects on Position on Tolerance to Apnoea. *Br J Anaesth* 2005; 95(5):706-9
 ***Brock-Ulne, J.G. Tracheal Intubation with the Patient in a Sitting Position. *Br J Anaesth* 1991; 67:225-6